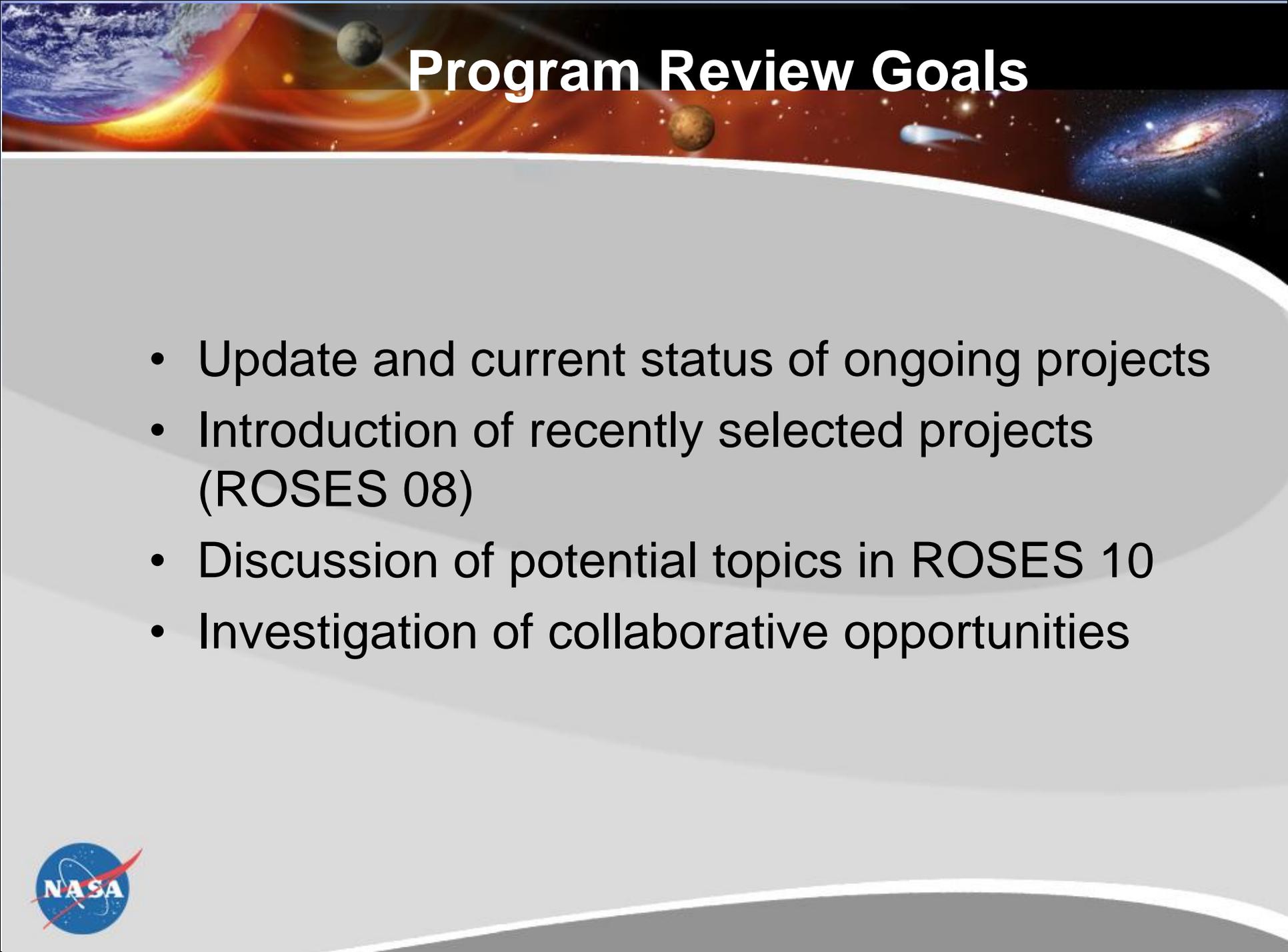




NASA Public Health Applications Program 2009 Program Review

***John A. Haynes
Program Manager, Public Health***

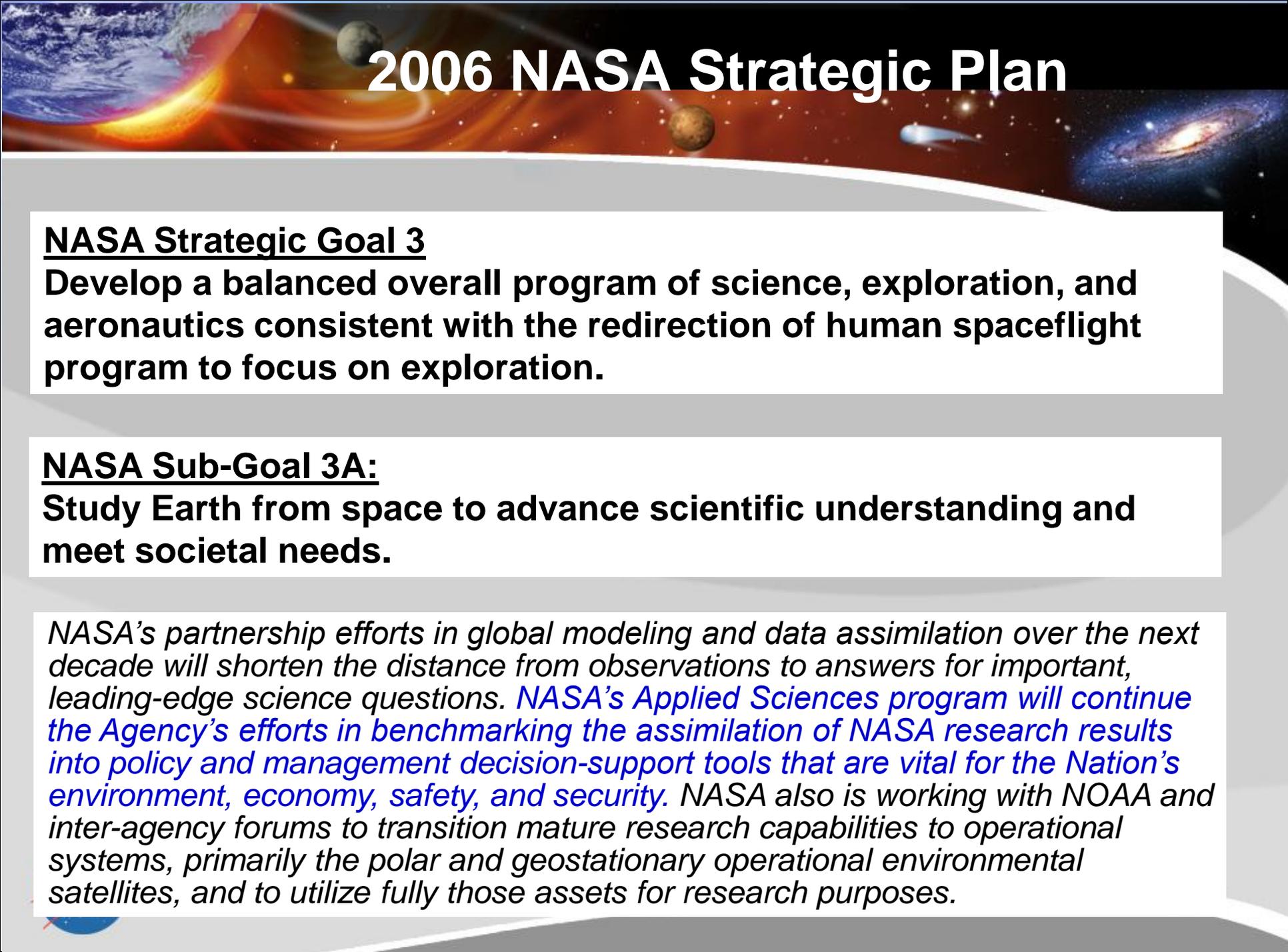
***Applied Sciences Program
Earth Science Division
Science Mission Directorate
NASA
Washington, DC USA***



Program Review Goals

- Update and current status of ongoing projects
- Introduction of recently selected projects (ROSES 08)
- Discussion of potential topics in ROSES 10
- Investigation of collaborative opportunities





2006 NASA Strategic Plan

NASA Strategic Goal 3

Develop a balanced overall program of science, exploration, and aeronautics consistent with the redirection of human spaceflight program to focus on exploration.

NASA Sub-Goal 3A:

Study Earth from space to advance scientific understanding and meet societal needs.

*NASA's partnership efforts in global modeling and data assimilation over the next decade will shorten the distance from observations to answers for important, leading-edge science questions. **NASA's Applied Sciences program will continue the Agency's efforts in benchmarking the assimilation of NASA research results into policy and management decision-support tools that are vital for the Nation's environment, economy, safety, and security.** NASA also is working with NOAA and inter-agency forums to transition mature research capabilities to operational systems, primarily the polar and geostationary operational environmental satellites, and to utilize fully those assets for research purposes.*

Earth System Science



Sun- Earth
Connection

Climate Variability
and Change

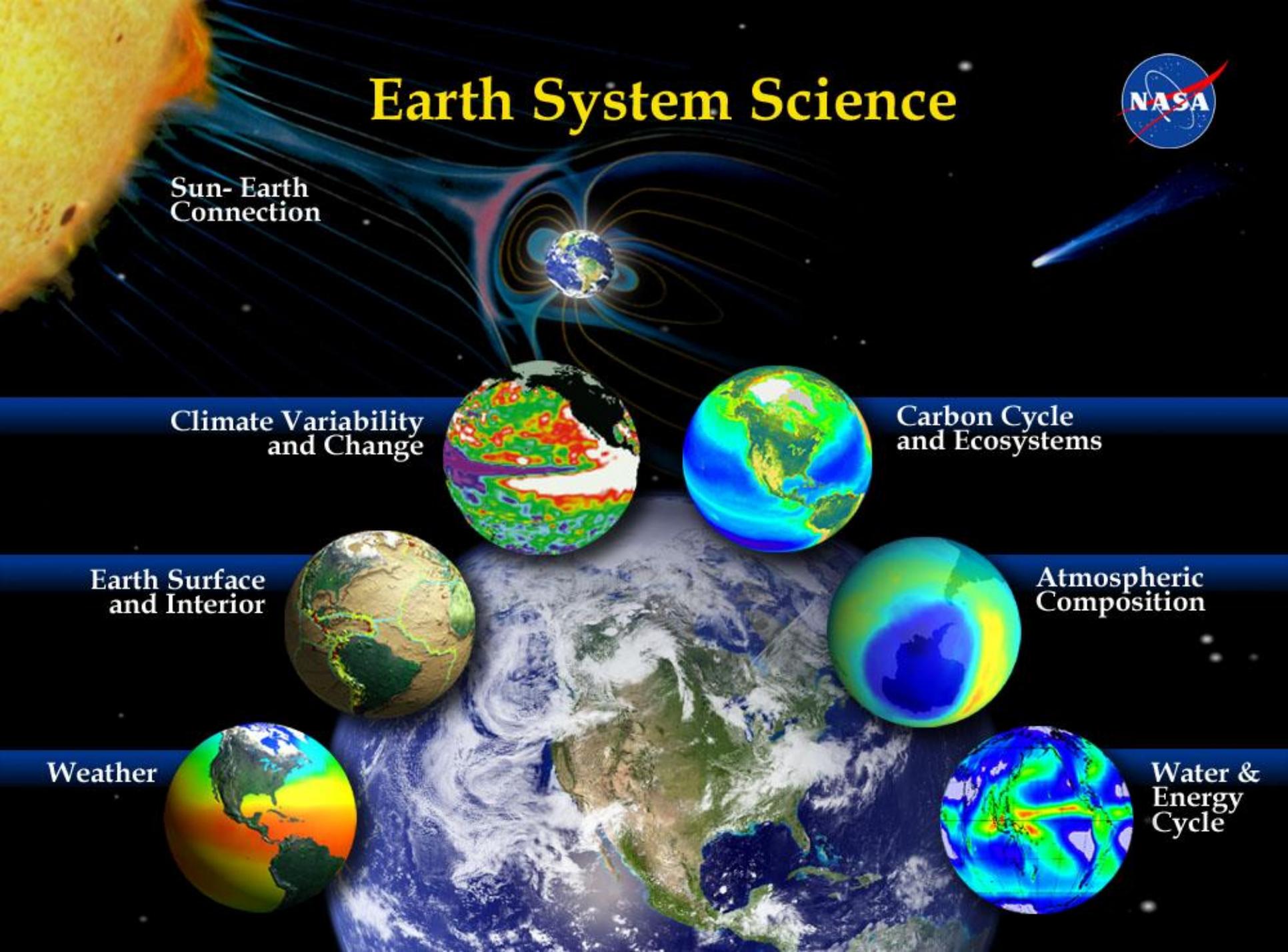
Carbon Cycle
and Ecosystems

Earth Surface
and Interior

Atmospheric
Composition

Weather

Water &
Energy
Cycle





“Fundamental improvement is needed in the structure and function of the nation’s observation and information systems to inform policy choices about economic prosperity and security, protect human health and property, and judiciously manage the resources of the planet. It is essential that the observation and information systems be viewed as an important element of a linked system, extending from observations to services for our public and private communities.” - (Earth Science Decadal Survey, 2007).

To this end, the NASA Applied Sciences Program Mission Statement:

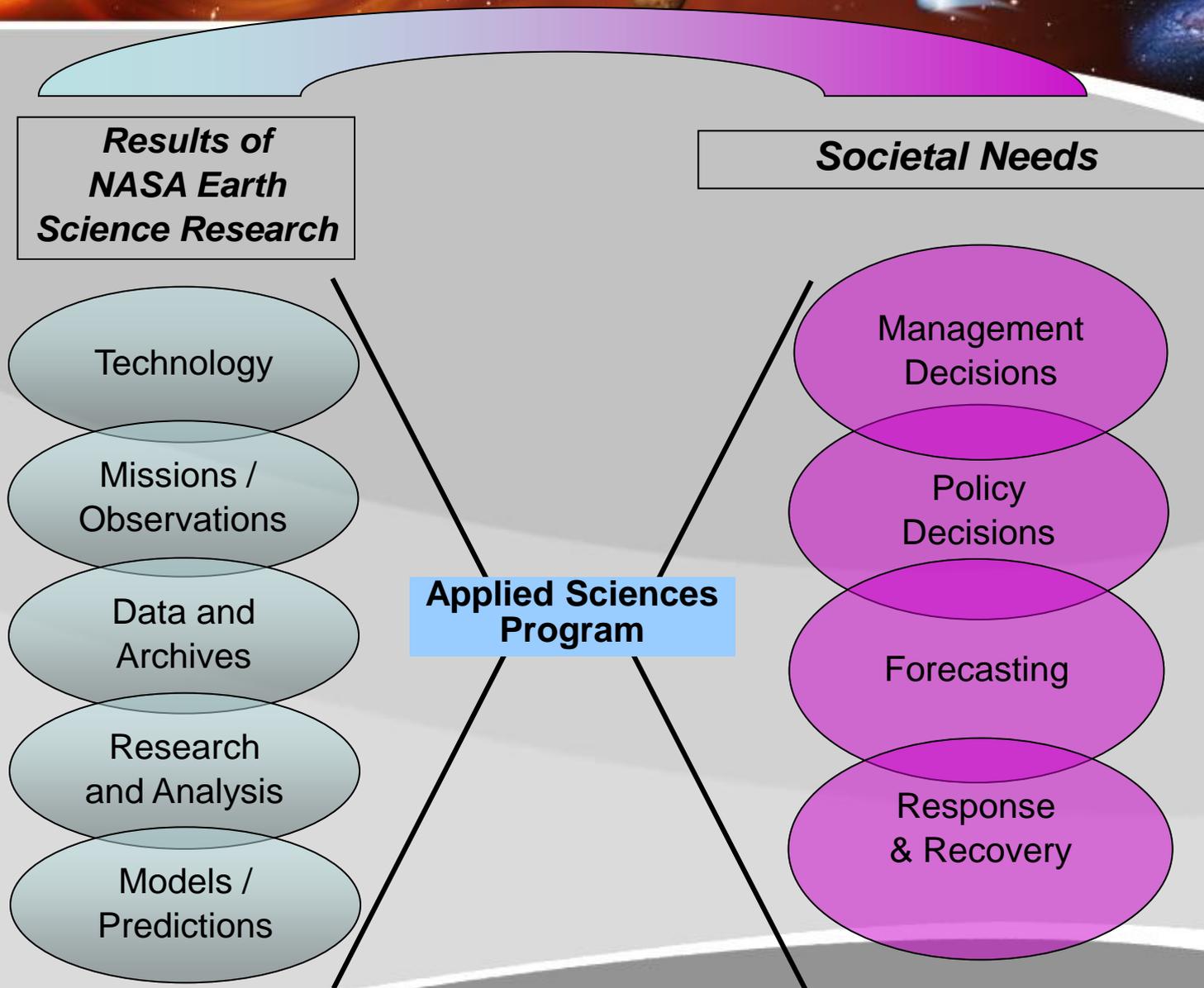
To expand and accelerate the realization of societal and economic benefits from NASA Earth observations by creating applications that address real-world problems

Strategic Goals of the Applied Sciences Program

- **Strategic Goal #1, Global Sustainability:** ASP will enhance the nation's and world's ability to confront today's challenges as well as to forecast the impacts of and develop adaptation and mitigation strategies for climate and Earth system change.
- **Strategic Goal #2, National Needs:** ASP will tailor projects to user and societal needs by diversifying its portfolio of projects, varying the size, duration, and risk/reward profile as appropriate to particular application areas.
- **Strategic Goal #3, Mission Definition and Utilization:** ASP will facilitate the integration of applications needs into Earth science mission planning to ensure the nation realizes the full value of its investment and to accelerate the utility of information to support decision-making.



NASA Applied Sciences Architecture





GEO 9 Societal Benefit Areas

Applied Sciences works across the 9 Societal Benefit Areas of GEO, with a focus on those areas where:

- *NASA has greatest capability and expertise*
- *Where there is greatest need for decision support*



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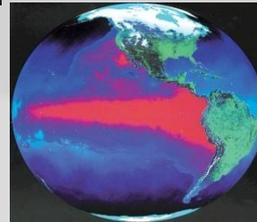
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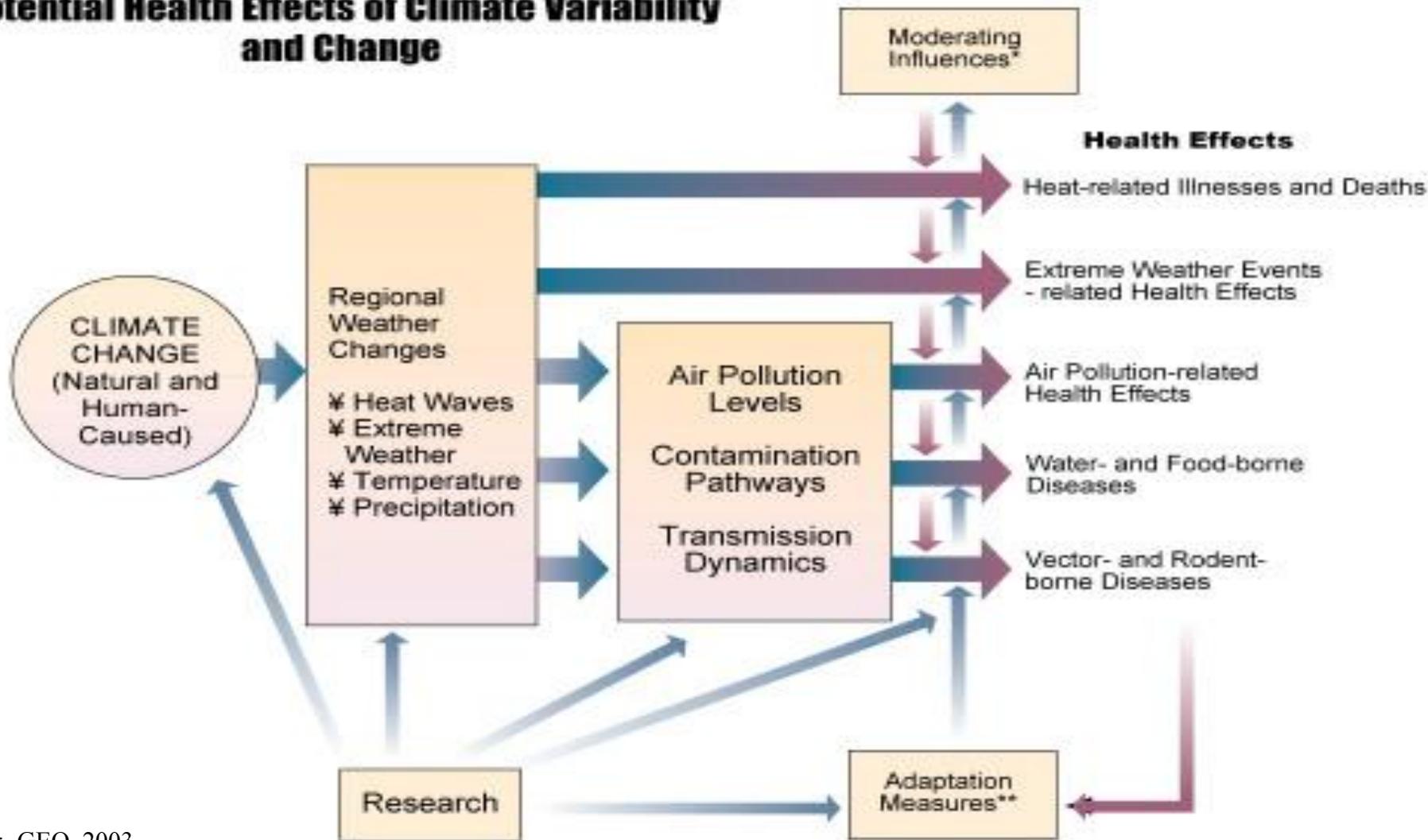


ceans



Why public health?

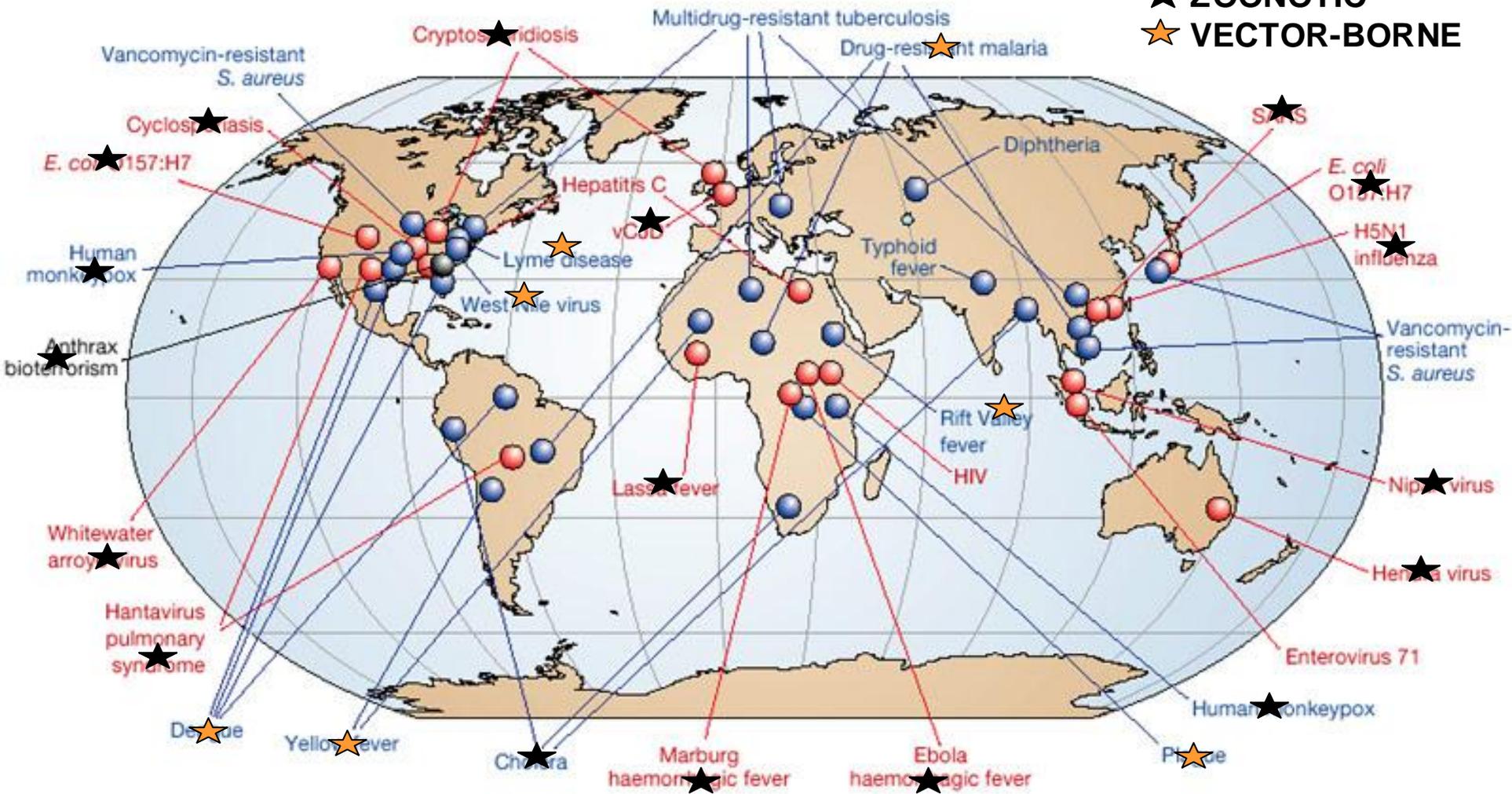
Potential Health Effects of Climate Variability and Change



Global Emerging Diseases*



★ ZONOTIC
 ★ VECTOR-BORNE



EMERGING
RE-EMERGING

* Modified from Morens et al. 2004 *Nature* 430:242



Focus Areas of Public Health

The Public Health application area focuses on Earth science applications to public health and safety, particularly regarding ***infectious disease, emergency preparedness and response, and environmental health*** issues. The application explores issues of toxic and pathogenic exposure, as well as natural and man-made hazards and their effects, for risk characterization/mitigation and improvements to health and safety.





Applied Sciences Program

Public Health

The Public Health application area focuses on Earth science applications to public health and safety, particularly regarding infectious disease, emergency preparedness and response, and environmental health issues. The application explores issues of toxic and pathogenic exposure, as well as natural and man-made hazards and their effects, for risk characterization/mitigation and improvements to health and safety.

Programmatic Themes

1. Environmental Health (including Oceans and Human Health) (9)
2. Infectious Disease (6)
3. Emergency Preparedness/Response (1)
4. Public Health Tracking/Information Networks (crosscuts)
5. Climate (crosscuts)

Program Management

- 1-page descriptions for all projects (currently under development)/web page
- Annual peer-reviewed publications
- Public Health Team Meeting
- Workshop/Conference Support

Goals

- Collaboration with other agencies to define the impact of climate change on public health
- Integration of NASA research into Public Health Information/Tracking Networks with the ability to track weather, climate, and environmental factors to improve disease outbreak and environmental health risk predictions to increase the public's warning time
 - EPHTN operational July 09
- NASA research utilized to enhance our nation's emergency response and preparedness (e.g., DOD-GEIS, Coast Guard)
- Issue joint solicitations with other agencies
- Focus on upcoming missions (Decadal Survey)
- Through community, stay abreast and ahead of emerging diseases/issues (past – pandemic flu)

Federal Partners: CDC, EPA, DOD, USGS, USAID



Applied Sciences – 2008 Solicitation

ROSES-2008

A.18 Decision Support through Earth Science Research Results

Results-oriented projects focused on the integration of Earth science research results into decision making activities related to one or more of the eight applications areas.

Overall objective:

Sustained use of Earth science products in decision making activities and an assessment of the value and benefit of the Earth science products.

A.19 Earth Science Applications Feasibility Studies

Short-term, feasibility studies of applications of Earth science research results that will improve decision-making activities.

Overall objective:

Generate and test preliminary ideas for applications of Earth science products to determine their potential value and readiness for a more in-depth project



Public Health Priority Areas in ROSES 2008 A.18

A. Oceans and human health

- Proposals in this area should be aligned with the “Interagency Oceans and Human Health Research Implementation Plan: A Prescription for the Future.” This document can be found at the following link: <http://ocean.ceq.gov/about/docs/ohhfinal.pdf>.

B. Public health impacts of climate change

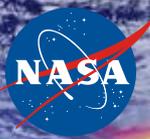
- The program requested proposals in the area of public health impacts of climate change. These proposals should utilize scenarios outlined by the International Panel on Climate Change (<http://www.ipcc.ch/>) as well as regional downscaling of Global Climate Models (GCMs).

Public Health Priority Areas in ROSES

2008 A.19

The program requested proposals to investigate the potential benefits and impacts of future satellite observations (e.g., Glory, NPP, GPM, LDCM, NPOESS, and SMAP) and models (e.g., ecological forecasting models, Global Climate Models (including regional downscaling)) on decision making in the areas of infectious disease, emergency preparedness and response, and environmental health.





Distribution of Total Proposals, by Application Area – Decisions (A.18)

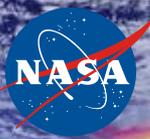
NASA Applied Sciences -- ROSES-08 A18 Decisions

Spread of Proposals and Awards by Solicitation and Application Topic

Proposals Received/Reviewed: 142	Proposals Reviewed	Selected	% Selected
Agriculture	27	7	26%
Air Quality	23	6	26%
Climate	17	5	29%
Disaster Management	22	3	14%
Ecological Forecasting	24	3	13%
Public Health	17	5	29%
Water Resources	34	6	18%
Weather	5	1	20%
Sub-Total *	169	36	25%

* Totals is more than Proposals Reviewed since some proposals were reviewed by more than one application area. (The total selected is 25% --- 36 / 142.)

Some projects will serve the interests of more than one application area.



Distribution of Total Proposals, by PI organization – Decisions (A.18)

Applied Sciences - ROSES-08 A.18 <i>Total Proposals, by PI Organization</i>		
	Submitted	
Total Proposals	142	
	Proposals Submitted	% of Total Submitted
By PI Organization		
NASA	24	17%
Academia	87	61%
Other Fed	15	11%
Private (NGO/Industry)	16	11%

Selected: 36
25% of Total Proposals



Distribution of Recommended Selections (by PI organization) – Decisions (A.18)

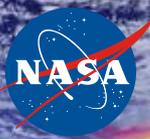
Applied Sciences - ROSES-08 A.18 Decisions

Proposals by PI Organization (Total Proposals: 142)

PI Organization	Proposals Submitted	Selected	% Selected of Those Submitted	Total # of Awards	% Selected of Total Awards
NASA	24	10	42%	36	28%
Academia	87	11	13%		31%
Other Fed	15	8	53%		22%
Private (NGO/Industry)	16	7	44%		19%

NASA Selections

GSFC – 5	(+10 Co-Is)	LaRC – 2	(+3 Co-Is)
JPL – 2	(+7 Co-Is)	ARC – 0	(+3 Co-Is)
MSFC – 1	(+4 Co-Is)	SSC – 0	(+1 Co-Is)



Distribution of Total Proposals, by Application Area – Feasibility (A.19)

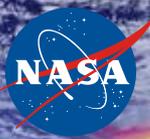
NASA Applied Sciences -- ROSES-08 A19 Feasibility

Spread of Proposals and Awards by Solicitation and Application Topic

<i>Proposals Received/Reviewed: 80</i>	Proposals Reviewed	Selected	% Selected
Agriculture	12	3	25%
Air Quality	23	5	22%
Climate	13	4	31%
Disaster Management	15	3	20%
Ecological Forecasting	9	2	22%
Public Health	7	5	71%
Water Resources	21	5	24%
Weather	5	4	80%
Sub-Total *	105	31	39%

* Totals is more than Proposals Reviewed since some proposals were reviewed by more than one application area. (The total selected is 39% --- 31 / 80.)

Some projects will serve the interests of more than one application area.



Distribution of Total Proposals (by PI organization) – Feasibility (A.19)

Applied Sciences - ROSES-08 A.19

Total Proposals, by PI Organization

	Submitted	
Total Proposals	80	
By PI Organization	Proposals Submitted	% of Total Submitted
NASA	16	20%
Academia	44	55%
Other Fed	4	5%
Private (NGO/Industry)	16	20%

Selected: 31
39% of Total Proposals



Distribution of Recommended Selections (by PI organization) – Feasibility (A.19)

Applied Sciences - ROSES-08 A.19 Feasibility

Proposals by PI Organization (Total Proposals: 80)

PI Organization	Proposals Submitted	Selected	% Selected of Those Submitted	Total # of Awards	% Selected of Total Awards
NASA	16	8	50%	31	26%
Academia	44	15	34%		48%
Other Fed	4	2	50%		6%
Private (NGO/Industry)	16	6	38%		19%

NASA Selections

GSFC – 5	(+3 Co-Is)	LaRC – 1	(+4 Co-Is)
JPL – 0	(+0 Co-Is)	ARC – 0	(+1 Co-Is)
MSFC – 1	(+0 Co-Is)	SSC – 1	(+0 Co-Is)

Research Opportunities in Space and Earth Sciences 2009 (ROSES)

NASA Research Announcement (NRA) solicits basic and applied research in support of the NASA Science Mission Directorate covering aspects of basic and applied research and technology in space and Earth sciences.

NRA #[NNH09ZDA001N](#)

Amendment A.40: “Earth Science for Decision Making: Gulf of Mexico Region”

Closing Date: November 19, 2009

Website: <http://nspires.nasaprs.com/>





ROSES 09: “Earth Science for Decision Making: Gulf of Mexico Region”

The overall objective of this solicitation is to create a suite of projects that will enhance the Gulf of Mexico region’s ability to use NASA Earth science observations and research in decision making activities. This solicitation has a special emphasis on climate adaptation and climate change impacts in the Gulf region and southeast United States. The recent report “Global Climate Change Impacts in the United States” (U.S. Global Change Research Program, 2009) outlines expected climate change impacts to US coastal communities: “Sea-level rise and storm surge will increase threats to homes and infrastructure including water, sewer, transportation, and communications systems. Many barrier islands and coastal marshes that protect the coastline and support healthy ecosystems will be lost.”

- Total Amount of Funding : ~\$5M total
- Anticipated Number of Awards: 10 – 20 projects
- Expected Range of Award per project: Up to 400K total
- Period of Performance: Up to 24 months
- Expected Project Start Date: Circa March 1, 2010

PUBLIC HEALTH PROPOSALS ARE SPECIFICALLY ENCOURAGED!!



Applied Sciences Program

Public Health – Potential ROSES 2010 Topics

Expected release in February 2010

DECISIONS (3-4 year projects)

- *Infectious Disease – particularly in the Americas*
- *Impacts of Climate Change on Public Health*
- *Emergency Preparedness/Response*

FEASIBILITY (12-18 month projects)

- *Investigations on potential applications for newly emerging or re-emerging diseases*
- *Leverage previous work into new systems (e.g., SERVIR) This would be more “integration” than “feasibility.”*

Other suggested topics from the community?

Additionally, other elements may be solicited such as regional collaboratives.

Future Observations for Health – Near Term

- **Glory – 2010**
 - Collect data on the properties of aerosols, including black carbon, in the Earth's atmosphere and climate system; collect data on solar irradiance for the long-term effects on the Earth climate record.
- **NPOESS Preparatory Mission (NPP) -- 2011**
 - NPP will serve as a bridge mission between the NASA Earth-observing research satellites Terra, Aura, and Aqua and the operational National Polar-Orbiting Operational Environmental Satellite System (NPOESS) constellation.
- **Landsat Data Continuity Mission (LDCM) -- 2013**
- **Global Precipitation Mission (GPM) – 2014**
 - Will provide accurate observations of the intensity and distribution of global precipitation. GPM builds on the heritage of the TRMM mission and is in partnership with JAXA.



Future Observations for Health – Decadal Survey First Tier

- **Hyperspectral Infrared Imager (HyspIRI) – ~2015**
 - HyspIRI will employ a hyperspectral imager and a thermal infrared scanner to monitor a variety of ecological and geological features at a wide range of wavelengths, including data on changes in vegetation type and deforestation for ecosystem management .
- **Soil Moisture Active Passive (SMAP) – 2013**
 - SMAP will use a combined radiometer and high-resolution radar to measure surface soil moisture and freeze-thaw state.
- **Deformation, Ecosystem Structure, and Dynamics of Ice (DESDynI) – ~2015**
 - DESDynI is a dedicated InSAR and LIDAR mission optimized for studying hazards and global environmental change, including the effects of changing climate on land use and species habitats.



2010



OSTM/Jason 2

Jason

Aquarius

QuikSCAT

ACRIMSAT

Landsat-7

EO-1

Aqua

Glory

SORCE

TRMM

Terra

GRACE

ICESat

CALIPSO

Aura

CloudSat

2011



Aqua

Terra

Aura

GRACE

NPP

CALIPSO

CloudSat

TRMM

SORCE

Glory

EO-1

Landsat-7

ACRIMSAT

Aquarius

Jason

OSTM/Jason 2

2012



OSTM/Jason 2

Jason

Aquarius

Landsat-7

Aqua

Glory

SORCE

TRMM

Terra

GRACE

NPP

CALIPSO

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CloudSat

2013



Aqua

Terra

Aura

Landsat-7

Glory

NPP

LDCM

SMAP

CALIPSO

CloudSat

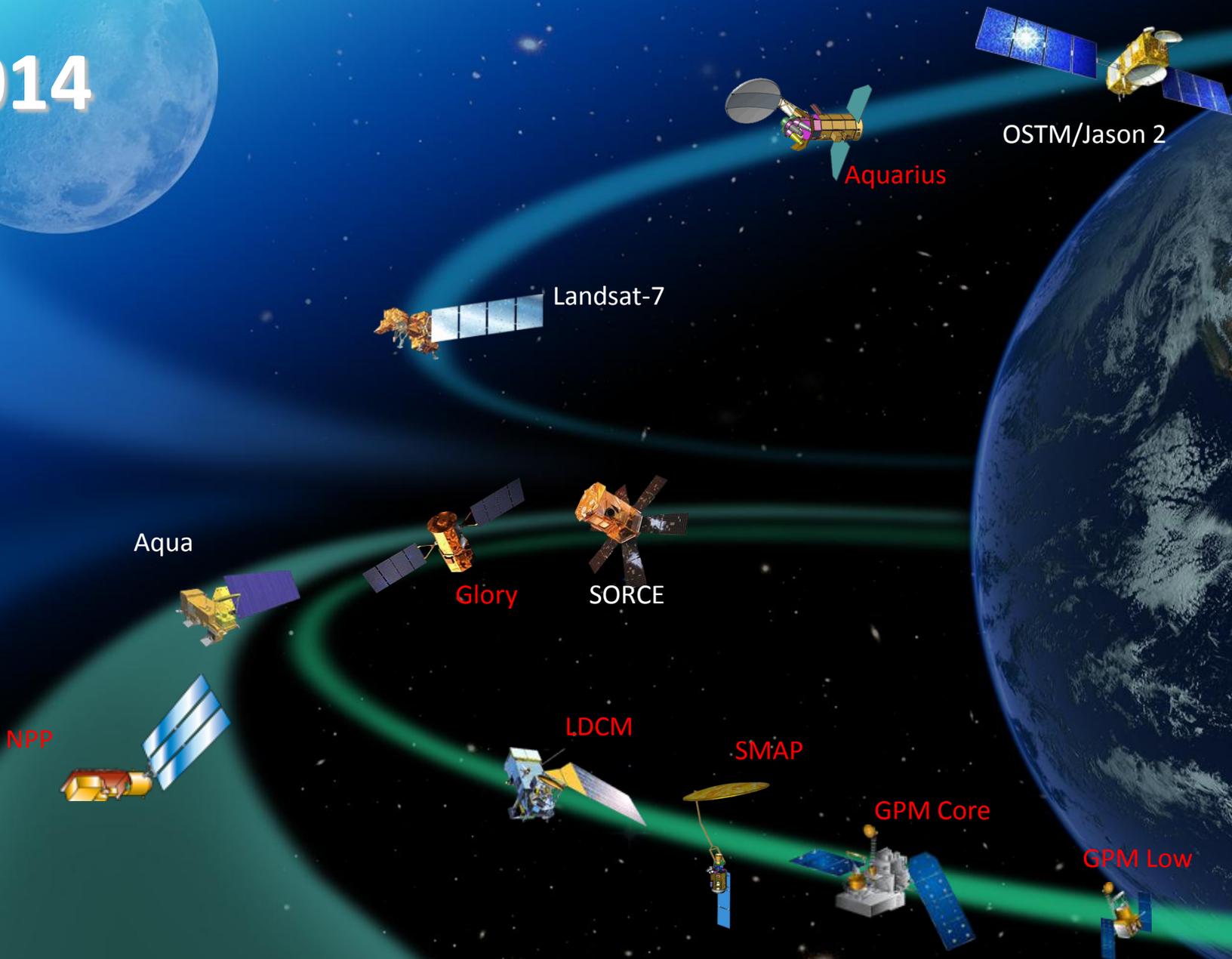
TRMM

SORCE

Aquarius

OSTM/Jason 2

2014



2015

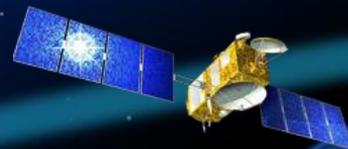
DesDynI



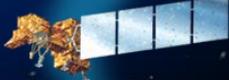
Aquarius



OSTM/Jason 2



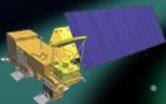
Landsat-7



ICESat II



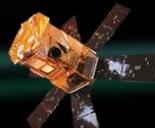
Aqua



Glory



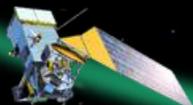
SORCE



NPP



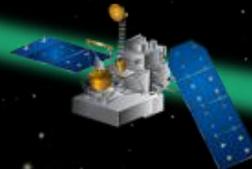
LDCM



SMAP



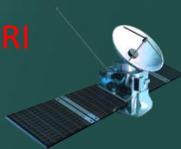
GPM Core



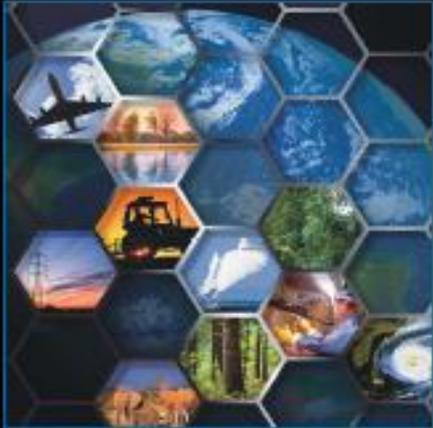
GPM Low



HyspIRI

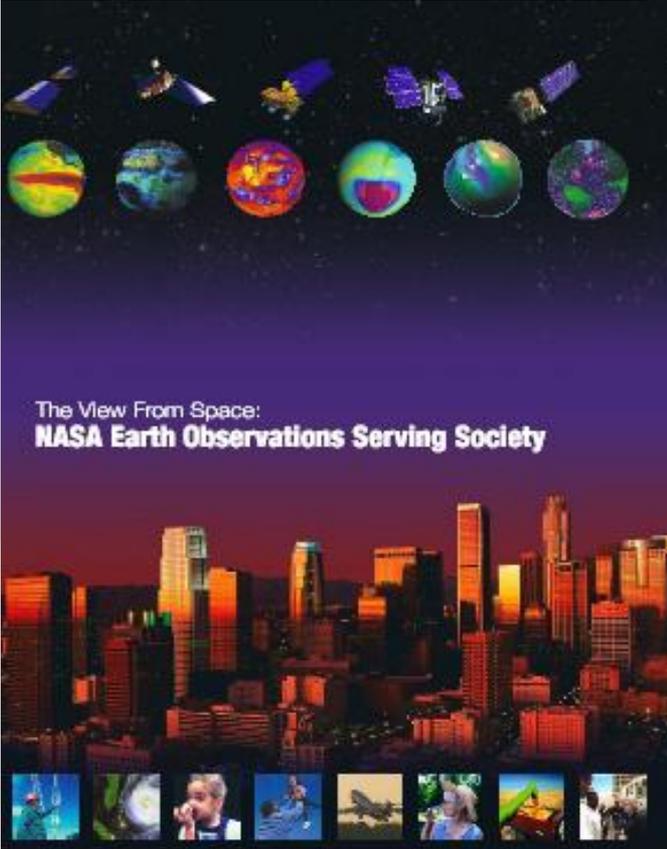


Applied Sciences Program



National Aeronautics and
Space Administration

**Earth Science Enterprise
Applications Plan**



The View From Space:
NASA Earth Observations Serving Society



<http://nasascience.nasa.gov/earth-science/applied-sciences>



Epidemiology in the 21st Century

